COURSE SYLLABUS

Course Title: **STEM Calculus III**

Abbreviated Title As Appears on Transcript: `STEM Calculus III`

Course Number: DMAT 273

Credit Hours: 3 credits [semester credit hours]

Course Description: A third course in the differential and integral calculus for engineering and science with emphasis on computational techniques, graphical analysis, and algebraic methods. Topics include splines, barriers, Taylor's Theorem, L'Hopital's Rule, infinite sequences and series, selected topics from three dimensional calculus and geometry.

Prerequisite: Successful completion (C- or higher) of Calculus II or equivalent, or consent of instructor.

Course Workload: 3 semester credit hours • 3 student work hours per credit hour • 14 week Carnegie semester = 126 hours student course workload average

Examination Requirements: Proctored written final examination must be passed at 60% or higher to earn passing grade in course. "B" and "A" grade paths have additional examinations.
See https://www.distancecalculus.com/grades/ for more information.

Course Professor: Robert R. Curtis, Ph.D.<rcurtis@rwu.edu>, <robert@distancecalculus.com>

University Information: Roger Williams University, University College, 1 Empire Plaza, Providence, RI, USA 02903. Roger Williams University, 1 Old Ferry Road, Bristol, RI 02809. Accredited by New England Commission of Higher Education (NECHE).
See https://www.rwu.edu/academics/accreditation/ for more information.

E-Textbook: *Calculus & LiveMath* by Robert R. Curtis, Ph.D., adapted from Davis/Porta/Uhl *Calculus&Mathematica* courseware series

Mathematical Software: LiveMath™ Computer Algebra & Graphing System

ADA ACCOMMODATIONS

Roger Williams University has a continuing commitment to providing reasonable accommodations for students with documented disabilities. Students with disabilities who need accommodations in order to fully participate in this class are urged to contact Student Accessibility Services, as soon as possible, to explore the arrangements needed to be made to assure access. Student Accessibility Services is open Monday

through Friday from 8:00AM to 5:00PM Eastern Time; Email: sas@rwu.edu or Voice: 401-254-3841. For more information about SAS, visit https://www.rwu.edu/undergraduate/academics/student-academic-success/student-accessibility-services-sas

Learning Outcomes for DMAT 273 - STEM Calculus III

1. To understand and compute parametric and Polar function integrals
2. To understand and compute splines and polynomial approximations
3. To understand and compute with Taylor's Theorem
4. To understand and compute with L'Hopital's Rule and using expansions to compute limits
5. To understand and compute sequences and series
6. To understand and compute convergence or divergence of sequences and series
7. To understand and compute 3D vector analysis, dot product, planes, and cross products
8. To understand and compute partial derivatives and tangent planes to a surface

Syllabus Topics Outline for DMAT 273 - STEM Calculus III

1. Getting Started
   - 1.1. Email and Chat
   - 1.2. Learning About the Course
   - 1.3. Required Hardware
   - 1.4. Software Fundamentals

2. Taylor's Expansion of a Function
   - 2.1 Splines and Smooth Splines
   - 2.2 Points of Contact
   - 2.3 Application: Landing an Airplane
   - 2.4 Taylor Expansion
   - 2.5 Recognizing Familiar Expansions
   - 2.6 Using Expansions for Approximations
   - 2.7 Derivatives and Integrals of Expansions
   - 2.8 Expansions At Other Points
   - 2.9 Newton's Method
   - 2.10 Calculating Limits: L'Hopital's Rule

3. Sequences and Series
   - 3.1 Sequences of Numbers
   - 3.2 Series of Numbers
   - 3.3 Convergence
   - 3.4 Convergence of Taylor Expansions
   - 3.5 Barriers: Radius of Convergence
   - 3.6 Shared Convergence Intervals for Derivatives and Integrals of Functions
   - 3.7 Applications: Drug Dosing

4. Power Series
   - 4.1 Basic Definition

- 4.2 Convergence Intervals of Power Series
- 4.3 Ratio Test and Other Convergence Tests
- 4.4 Finding Series Convergence Values via Power and Taylor Series

5. Polar Coordinates
   - 5.1 Basic Graphing
   - 5.2 Recognizable Curves
   - 5.3 Differentiation and Integration in Polar Coordinates

6. Vector Analysis
   - 6.1 Vector Arithmetic
   - 6.2 Dot Product, Cross Product
   - 6.3 Planes
   - 6.4 Partial Derivatives
   - 6.5 Tangent Planes